WHAT IS CLAIMED IS:

1. An imaging method for imaging a fine pattern having linear features extending along orthogonal first and second directions, characterized by:

providing a light source having decreased intensity portions at a center thereof and on first and second axes defined to intersect with each other at the center and defined along the first and second directions, respectively; and

illuminating the pattern with light from the light source.

2. A method according to Claim 1, wherein the intensity at each decreased intensity portion is decreased to about zero.

3. A method according to Claim 1, wherein the light source comprises four sections having substantially the same light intensity and being distributed in four quadrants defined by the center and the first and second axes, and wherein the four sections are disposed in an angularly symmetrical relationship with respect to the center.

4. A method according to Claim 3, wherein the intensity at each decreased intensity portion is

decreased to about zero.

5. A method according to any one of Claims 1 - 4, wherein the light source is provided by light from one of a lamp and a laser.

6. A device for forming an image of a fine pattern having linear features extending in orthogonal first and second directions, said device comprising:

a primary light source;

an illumination optical system for illuminating the pattern, said illumination optical system having means for forming, with light from said primary light source, a secondary light source having decreased intensity portions at a center thereof and on first and second axes defined to intersect with each other at the center and defined along the first and second directions, respectively; and

a projection optical system for projecting, on a predetermined plane, an image of the pattern illuminated with light from said secondary light source.

7. A device according to Claim 6, wherein the intensity at each decreased intensity portion is decreased to about zero.

8. A device according to Claim 6, wherein said secondary light source comprises four sections having substantially the same light intensity and being distributed in four quadrants defined by the center and the first and second axes, and wherein the four sections are disposed in an angularly symmetrical relationship with respect to the center.

9. A device according to Claim 8, wherein the intensity at each decreased intensity portion is decreased to about zero.

10. A device according to Claim 8 or 9, wherein said secondary light source forming means includes (i) an optical integrator having a light receiving surface and a light emitting surface, for receiving with said light receiving surface the light from said primary light source and dividing the received light to provide a plurality of light beams from said light emitting surface, and (ii) stop means having four apertures disposed adjacent to one of said light receiving surface and said light emitting surface of said optical integrator to define the four sections of said secondary light source.

11. A device according to Claim 8 or 9, wherein said secondary light source forming means includes (i)

an optical integrator having a light receiving surface and a light emitting surface, for receiving with said light receiving surface the light from said primary light source and dividing the received light to provide a plurality of light beams from said light emitting surface, and (ii) stop means of cross-like shape disposed adjacent to one of said light receiving surface and said light emitting surface of said optical integrator to define the four sections of said secondary light source.

12. In a microdevice manufacturing method including a step for imaging on a workpiece a fine pattern having linear features extending along orthogonal first and second directions to print the fine pattern on the workpiece, the improvements residing in:

providing a light source having decreased intensity portions at a center thereof and on first and second axes defined to intersect with each other at the center and defined along the first and second directions, respectively; and

illuminating the pattern with light from the light source.

13. A method according to Claim 12, wherein the intensity at each decreased intensity portion is

decreased to about zero.

14. A method according to Claim 12, wherein the light source comprises four sections having substantially the same light intensity and being distributed in four quadrants defined by the center and the first and second axes, and wherein the four sections are disposed in an angularly symmetrical relationship with respect to the center.

15. A method according to Claim 14, wherein the intensity at each decreased intensity portion is decreased to about zero.

16. A method according to any one of Claims 12 - 15, wherein the light source is provided by ultraviolet light from one of a mercury lamp and an excimer laser.

17. A microdevice manufacturing projection exposure apparatus for projecting an image of a pattern of an original on a workpiece, said apparatus comprising:

an X-Y stage for supporting thereon the workpiece and being movable along X and Y directions in an X-Y coordinate system defined in said apparatus;

means for forming, with light from a primary

light source, a secondary light source having decreased intensity portions at a center thereof and on first and second axes defined to intersect with each other at the center and defined along the X and Y directions, respectively;

a condensing optical system for illuminating the pattern of the original with light from said secondary light source; and

a projection optical system for projecting on the workpiece an image of the pattern illuminated with the light from said secondary light source.

18. An apparatus according to Claim 17, wherein the intensity at each decreased intensity portion is decreased to about zero.

19. An apparatus according to Claim 17, wherein said secondary light source comprises four sections having substantially the same light intensity and being distributed in four quadrants defined by the center and the first and second axes, and wherein the four sections are disposed in an angularly symmetrical relationship with respect to the center.

20. An apparatus according to Claim 19, wherein the intensity at each decreased intensity portion is decreased to about zero.

21. An apparatus according to Claim 19 or 20, wherein said secondary light source forming means includes (i) an optical integrator having a light receiving surface and a light emitting surface, for receiving with said light receiving surface the light from said primary light source and dividing the received light to provide a plurality of light beams from said light emitting surface, and (ii) stop means having four apertures disposed adjacent to one of said light receiving surface and said light emitting surface of said optical integrator to define the four sections of said secondary light source.

22. An apparatus according to Claim 19 or 20, wherein said secondary light source forming means includes (i) an optical integrator having a light receiving surface and a light emitting surface, for receiving with said light receiving surface the light from said primary light source and dividing the received light to provide a plurality of light beams from said light emitting surface, and (ii) stop means of cross-like shape disposed adjacent to one of said light receiving surface and said light emitting surface of said optical integrator to define the four sections of said secondary light source.

23. An apparatus according to any one of Claims 17 - 22, further comprising means for detecting a light intensity distribution of said secondary light source.

24. A microdevice manufacturing projection exposure apparatus for projecting an image of a pattern of an original on a workpiece, said apparatus comprising:

an X-Y stage for supporting thereon the workpiece and being movable along X and Y directions in an X-Y coordinate system defined in said apparatus;

means for selectively forming, with light from a primary light source, different secondary light sources of different light intensity distributions including a particular secondary light source having decreased intensity portions at a center thereof and on first and second axes defined to intersect with each other at the center and defined along the X and Y directions, respectively;

a condensing optical system for illuminating the pattern of the original with light from a secondary light source selectively formed by said selectively forming means; and

a projection optical system for projecting an image of the illuminated pattern on the workpiece.

25. An apparatus according to Claim 24, wherein said selectively forming means includes (i) an optical integrator having a light receiving surface and a light emitting surface, for receiving with said light receiving surface the light from said primary light source and dividing the received light to provide a plurality of light beams from said light emitting surface, and (ii) first and second stop means each being disposed adjacent to one of said light receiving surface and said light emitting surface of said optical integrator, said first stop means having four off-axis apertures for defining said particular secondary light source, and said second stop means having an on-axis aperture.

26. An apparatus according to Claim 25, wherein said particular secondary light source comprises four sections having substantially the same light intensity and being distributed in four quadrants defined by the center and the first and second axes, and wherein the four sections are disposed in an angularly symmetrical relationship with respect to the center.

27. An apparatus according to Claim 25 or 26, wherein the intensity at each decreased intensity portion of said particular s condary light source is decreased to about zero.

28. In a method of imaging a fine pattern having linear features extending in orthogonal first and second directions, wherein the pattern is illuminated with light obliquely with respect to the pattern, the improvements residing in that:

the strength of illumination of the pattern in a first plane of incidence including the first direction and the strength of illumination of the pattern in a second plane of incidence including the second direction are made lower than that in a third plane of incidence other than the first and second planes.

29. A method according to Claim 28, wherein, in each of the first plane of incidence and the second plane of incidence, the illumination of the pattern with light is substantially blocked.

30. A method according to Claim 28 or 29, wherein the predetermined plane of incidence is defined with an angle of about 45 degrees with respect to one of the first plane of incidence and the second plane of incidence.

31. In a method of manufacturing microdevices wherein a fine pattern having linear features

extending in orthogonal first and second directions is illuminated with light obliquely with respect to the pattern and wherein the illuminated pattern is imaged and printed on a workpiece, the improvements residing in that:

the strength of illumination in a predetermined plane of incidence is made greater than that in a first plane of incidence including the first direction and that in a second plane of incidence including the second direction and intersecting with the first plane of incidence perpendicularly.

32. A method according to Claim 31, wherein, in each of the first plane of incidence and the second plane of incidence, the illumination of the pattern with light is substantially blocked.

33. A method according to Claim 31 or 32, wherein the predetermined plane of incidence is defined with an angle of about 45 degrees with respect to one of the first and second directions.

34. In a method of imaging a fine pattern having linear features each extending in a predetermined direction, wherein the pattern is illuminated with light obliquely with respect to the pattern, the improvements residing in that:

the illumination of the pattern with light along a path in a plane of incidence including the predetermined direction is substantially blocked; and

the pattern is illuminated with light along a pair of paths which are symmetrical with each other with respect to the plane of incidence.

35. In a method of manufacturing microdevices wherein a fine pattern having linear features each extending in a predetermined direction is illuminated with light obliquely with respect to the pattern and wherein the illuminated pattern is imaged and printed on a workpiece, the improvements residing in that:

the illumination of the pattern with light along a path in a plane of incidence including the predetermined direction is substantially blocked; and

the pattern is illuminated with light along a pair of paths which are symmetrical with each other with respect to the plane of incidence.

36. A projection exposure apparatus for projecting on a workpiece an image of an original having a pattern of linear features, said apparatus comprising:

an X-Y stage for supporting thereon the workpiece and being movable along X and Y directions in an X-Y coordinate system defined in said apparatus;

means for illuminating the mask with light obliquely with respect to the mask, wherein a beam component of the light in a first plane of incidence including the X direction and a beam component of the light in a second plane of incidence including the Y direction and intersecting with the first plane of incidence perpendicularly, each has a strength made lower than that of a beam component of light in a third plane of incidence other than the first and second planes; and

a projection optical system for projecting on the workpiece an image of the patter of the mask illuminated by said illuminating means.

37. An apparatus according to Claim 36, wherein the strength of each of the beam components in the first plane of incidence and the second plane of incidence is decreased to about zero.

38. An apparatus according to Claim 36 or 37, wherein the predetermined plane of incidence is defined with an angle of about 45 degrees with respect to one of the X and Y directions.

39. A projection exposure apparatus for projecting on a workpiece an image of an original having a grating pattern, said apparatus comprising:

an X-Y stage for supporting thereon the workpiece and being movable along X and Y directions in an X-Y coordinate system defined in said apparatus;

means for illuminating the pattern of the mask with light obliquely with respect to the pattern and along a pair of paths which are symmetric with each other with respect to a predetermined plane of incidence including the X direction, while substantially blocking the illumination of the pattern along a path in the predetermined plane of incidence; and

a projection optical system for projecting on the workpiece an image of the patter of the mask illuminated by said illuminating means.

40. An apparatus according to Claim 39, wherein the strength of a beam beam component in the predetermined plane of incidence is decreased to about zero.

41. An illumination method in image projection, for illuminating a fine pattern of an original, characterized by:

providing a light intensity distribution having decreased intensity portions at a center thereof and on first and second orthogonal axes with respect to which the original is to be placed.

42. A method according to Claim 41, wherein the strength at each of the decreased intensity portions is decreased to about zero.

43. An illumination method in image projection, for obliquely illuminating with light a fine pattern of an original placed with reference to first and second orthogonal axes, characterized in that:

the strength of illumination of the pattern in a first plane of incidence including the first axis and the strength of illumination of the pattern in a second plane of incidence including the second axis are made lower than that in a third plane of incidence other than the first and second planes.

44. A method according to Claim 43, wherein the illumination of the pattern along each of the first and second planes is substantially blocked.

45. A microdevice manufactured in accordance with a method as defined in any one of Claims 1 - 5, 12 - 16, 28 - 35 and 41 - 44.

46. A microdevice manufactured by using a device or an apparatus as defined in any one of Claims 6 - 11, 17 - 27 and 36 - 40.